

**Notice of Allowability**

Application No.

10/660,557

Examiner

Navin Natnithadha

Applicant(s)

ITO ET AL.

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**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 13 July 2005.
2. ☒ The allowed claim(s) is/are 1-14.
3. ☒ The drawings filed on 22 January 2004 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☒ All    b) ☐ Some\*    c) ☐ None    of the:
    1. ☒ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |   |   |
|---|---|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892)  | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)           |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                | 6. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date _____ |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),<br>Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment                   |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material          | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance  |
|   | 9. <input type="checkbox"/> Other _____   |

### EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Chid S. Iyer on 12 August 2005.

The application has been amended as follows:

#### IN THE CLAIMS:

Replace claims 1, 3, 5, 9, and 12-14 with the following:

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1. (currently amended): A method of processing an observed pulse wave data, comprising steps of:

irradiating a living body with a first light beam having a first wavelength and a second light beam having a second wavelength which is different from the first wavelength;

converting the first light beam and the second light beam, which have been reflected or transmitted from the living body, into a first electric signal corresponding to the first wavelength and a second electric signal corresponding to the second wavelength, as the observed pulse wave data;

dividing a frequency band of the observed pulse wave data into a plurality of frequency ranges;

computing a light absorbance ratio obtained from the first electric signal and the second electric signal, for each one of the divided frequency ranges ~~dividing an observed frequency band~~; and

determining that noise is not mixed into the observed pulse wave data in a case where a substantial match exists among light absorbance ratios computed for the respective frequency ranges.

3. (currently amended): A method of processing an observed pulse wave data, comprising steps of:

irradiating a living body with a first light beam having a first wavelength and a second light beam having a second wavelength which is different from the first wavelength;

converting the first light beam and the second light beam, which have been reflected or transmitted from the living body, into a first electric signal corresponding to the first wavelength and a second electric signal corresponding to the second wavelength, as the observed pulse wave data; and

whitening the first electric signal and the second electric signal by an affine transformation using a known light absorbance ratio, in order to separate a pulse signal component and a noise component which are contained in the observed pulse wave data.

5. (currently amended): The signal processing method as set forth in claim 3, further comprising steps of:

dividing a frequency band of the observed pulse wave data into a plurality of frequency ranges;

computing a light absorbance ratio obtained from the first electric signal and the second electric signal, for each one of the divided frequency ranges ~~dividing an observed frequency band~~; and

determining that noise is not mixed into the observed pulse wave data in a case where a substantial match exists among light absorbance ratios computed for the respective frequency ranges,

wherein one of the light absorbance ratios, which are determined that the noise is not mixed therein, is used as the known light absorbance ratio.

9. (currently amended): A method of processing an observed pulse wave data, comprising steps of:

irradiating a living body with a first light beam having a first wavelength and a second light beam having a second wavelength which is different from the first wavelength;

converting the first light beam and the second light beam, which have been reflected or transmitted from the living body, into a first electric signal corresponding to the first wavelength and a second electric signal corresponding to the second wavelength, as the observed pulse wave data;

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dividing a frequency band of the observed pulse wave data into a plurality of frequency ranges; and

whitening the first electric signal and the second electric signal to separate a pulse signal component and a noise component which are contained in the observed pulse wave data, for each one of the divided frequency ranges ~~dividing an observed frequency band~~.

12. (currently amended): A pulse photometer comprising:

a first light source adapted to irradiate a living body with a first light beam having a first wavelength;

a second light source adapted to irradiate the living body with a second light beam having a second waveform which is different from the first wavelength;

a converter operable to convert the first light beam and the second light beam subsequent to irradiating the living body to a first and second electrical signals, respectively, as observed data;

a processor operable to divide a frequency band of the observed data into a plurality of frequency ranges, compute a light absorption ratio based on the first and second electrical signals for each one of the divided frequency ranges, ~~and a range of frequencies in an observed frequency band~~; and the processor further operable to determine that noise is not mixed in the observed data in case where a substantial match exists among light absorbance ratios ~~computer~~ computed for the respective range of frequencies.

13. (Currently amended): A pulse photometer comprising:

a first light source adapted to irradiate a living body with a first light beam having a first wavelength;

a second light source adapted to irradiate the living body with a second light beam having a second waveform which is different from the first wavelength;

a converter operable to convert the first light beam and the second light beam subsequent to irradiating the living body to a first and second electrical signals, respectively, as observed pulse wave data;

a processor operable to whiten the first and the second electrical signals by affine transformation using a known light absorbance ratio to separate a pulse signal component and a noise component contained in the observed pulse wave data.

14. (Currently amended): A pulse photometer, comprising:

a first light source adapted to irradiate a living body with a first light beam having a first wavelength;

a second light source adapted to irradiate the living body with a second light beam having a second waveform which is different from the first wavelength;

a converter operable to convert the first light beam and the second light beam subsequent to irradiating the living body to a first and second electrical signals, respectively, as observed data;

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a processor operable to divide a frequency band of the observed data into a plurality of frequency ranges, and whiten ~~compute~~ the first and the second electrical signals to separate a pulse signal component and a noise component contained in the observed data for each one of ~~a range of frequencies in an observed frequency band~~ the divided frequency ranges.

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### REASONS FOR ALLOWANCE

2. Claims 12-14 have been amended. Claims 1-14 are pending.
3. The objection of claims 12-14 is WITHDRAWN in view of the Amendment.
4. The objection of the Specification is WITHDRAWN in view of the submission of the Substitute Specification.
5. Applicant's arguments, see pages 10 and 11, filed 13 July 2005, with respect to claims 9, 10, and 14 have been fully considered and are persuasive. The 35 U.S.C. 102(b) rejection of claims 9, 10, and 14 has been withdrawn.
6. Claims 1-14 are allowed.
7. The following is an examiner's statement of reasons for allowance:

As to claims 1 and 2, the prior art of record does not teach a method of processing a pulse photometer, comprising: computing a light absorbance ratio obtained from the first electric signal (infrared) and the second electric signal (red), for each one of frequency ranges dividing an observed frequency band; and determining that noise is not mixed into the observed pulse wave data in a case where a substantial match exists among light absorbance ratios computed for the respective frequency ranges. As to claim 12, the prior art does not teach a pulse photometer including a processor operable to perform the above function. Support for the allowable subject matter is on page 20, lines 4-17 and page 20, line 24 to page 21, line 8.

As to claims 3-8, the prior art of record does not teach a method of processing a pulse photometer, comprising: whitening the first electric signal (infrared) and the second electric signal (red) by an affine transformation using a known light absorbance



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ratio, in order to separate a pulse signal component and a noise component which are contained in the observed pulse data. As to claim 13, the prior art does not teach a pulse photometer including a processor operable to perform the above function.

Support for the allowable subject matter is on page 22, line 6-24.

As to claims 9-11, the prior art of record does not teach a method of processing a pulse photometer, comprising: a whitening the first electric signal (infrared) and the second electric signal (red) to separate a pulse signal component and a noise component which are contained in the observed pulse data, for each one of frequency ranges dividing an observed frequency band. As to claim 14, the prior art does not teach a pulse photometer including a processor operable to perform the above function. Support for the allowable subject matter is on page 21, line 9-22.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Navin Natnithithadha whose telephone number is (571) 272-4732. The examiner can normally be reached on Monday-Friday, 8:00-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Max Hindenburg can be reached on (571) 272-4726. The fax phone

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number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Navin Natnithithadha  
Patent Examiner  
GAU 3736  
12 August 2005



ROBERT L. NASSER  
PRIMARY EXAMINER